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Case Report

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# *Salmonella* Osteomyelitis in a Patient With Systemic Lupus Erythematosus

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## Abstract

Although infections occur commonly in patients with systemic lupus erythematosus (SLE), *Salmonella* osteomyelitis is rarely reported in SLE patients. Hereby, we described an SLE case which was complicated by *Salmonella* infection. The reported case was referred to our center with right knee swelling and pain from 2 months before her admission. Because of no responding to appropriate therapy and high C reactive protein (CRP) level, we suspected to other differential diagnosis such as infection. Knee MRI was in favor of osteomyelitis of distal femur and proximal tibia. It was approved by the bone specimen culture. Patient's symptoms were significantly better 1 month after debridement surgery and antibiotic therapy. This case indicates that rare infection site such as bone with unusual organism causes should be considered in SLE patients coming with unexpected symptoms looking like prolonged joint swelling and pain despite appropriate therapy.

**Keywords:** Systemic lupus erythematosus; Osteomyelitis; *Salmonella*

## Introduction

Systemic lupus erythematosus (SLE) is a systemic autoimmune disease that has protean manifestations [1]. Many organ systems such as skin, joint, kidney, blood cells and nervous system could be involved in SLE. Moreover, SLE patients are susceptible to different kinds of infection mainly in lung, skin and genitourinary tract [2, 3]. However osteomyelitis is rarely reported in these patients especially due to uncommon organisms such as *Salmonella* [4]. On the other hand, it is difficult to differentiate osteomyelitis from arthritis particularly in bones near the joints [3]. In this case report, we describe a rare case of SLE who came with prolonged right knee swelling and finally the diagnosis was *Salmonella* osteomyelitis.

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## Case Report

In July 2014, a 51-year-old woman was referred to the rheumatology clinic in Imam Khomeini Complex Hospital, Tehran, Iran with complaint of right knee swelling from 2 months before her admission. The diagnosis of SLE was confirmed because of skin rashes, arthritis, kidney involvement (proven by kidney biopsy), positive antinuclear antibody (ANA) and anti-double-stranded DNA (anti-dsDNA), and she was treated with prednisolone 5 mg 3 times a day, and hydroxychloroquine 200 mg twice a day by impression of SLE flare up. Also she took mycophenolate mofetil (Cellcept) 1 g daily because of kidney involvement. She didn't have any past medical history of other diseases.

On physical examination her vital signs were as follows: temperature: 37 °C; blood pressure: 110/70 mm Hg; regular pulse rate with 84/min; respiration rate: 16/min. All other findings of her physical examinations were normal except her right knee which was swollen and red with limited range of motion.

The laboratory results and urine analysis are shown in Table 1.

Because of persistent arthritis and high C reactive protein (CRP) levels despite of appropriate therapy, we considered other differential diagnosis such as septic arthritis other than arthritis due to SLE. As a result, arthrocentesis was done. The result was as below, color: yellow; turbidity: increased; viscosity: decreased; pH: 6; red blood cell: 850/mm$^3$; white blood cell: 10 - 15/mm$^3$; crystals: none; and the culture result was negative.

Blood culture was taken and rechecked again in which results were negative. Purified protein derivative (PPD) was also checked with the negative result.

As knee radiography showed joint space narrowing and some findings in favor of osteomyelitis such as periosteal elevation (Fig. 1), MRI was done for further evaluation (Fig. 2). It showed geographic shape lesions in distal of femur, proximal of tibia and patella that was consistent with bone infections. Due to high suspicious to osteomyelitis, bone biopsy

**Table 1.** Laboratory Data and Urine Analysis of the Patient

| Laboratory data | Result |
|---|---|
| Analytic | |
| ESR | 98 mm/h (normal < 30) |
| CRP | 53 mg/L (normal < 10) |
| Hemoglobin | 10.8 g/dL |
| Red blood cell | $3.52 \times 10^6$ cells/µL |
| White blood cells | $8.6 \times 10^3$ cells/µL |
| Neutrophils | 81.2% |
| Lymphocytes | 13% |
| Platelets | $3.2 \times 10^5$ cells/µL |
| ANA | > 100 IU/mL (normal < 10) |
| Anti-dsDNA | 154.7 IU/mL (negative < 30) |
| C3 | 110 mg/dL (normal: 90 - 180) |
| C4 | 18 µg/dL (normal: 10 - 40) |
| CH50 | > 90% |
| Urea | 36 mg/dL (normal: 13 - 43) |
| Creatinine | 1.1 mg/dL (normal: 0.6 - 1.1) |
| Albumin | 4.5 g/dL (normal: 3.5 - 5.5) |
| Urine analysis | |
| Color | Yellow |
| Appearance | Turbid |
| Blood | Trace |
| White blood cells | Many |
| Red blood cell | 2 – 4 |
| Epithelial cell | 0 – 1 |
| Bacteria | Rare |
| Yeast and parasites | Negative |
| Cast | Negative |
| Crystals | Negative |
| Urine culture | Negative |
| Specific gravity | 1,020 |
| pH | 6 |
| Protein | 2+ |
| Glucose | Negative |
| Nitrite | Negative |
| Leukocyte esterase | Negative |
| Ketone | Negative |
| Bilirubin | Negative |
| Urobilinogen | Negative |

ESR: erythrocyte sedimentation rate; CRP: C-reactive protein; ANA: antinuclear antibody; Anti-dsDNA: anti-double-stranded DNA.

was taken.

The biopsy sample was examined for smear, culture and also PCR evaluation for tuberculosis. Interestingly the laboratory result showed positive culture for *Salmonella* which was sensitive to ciprofloxacin. Therefore, she was treated with ciprofloxacin 400 mg IV twice a day. Arthralgia and swelling were diminished as a consequence of medical and surgical debridement after 4 weeks of starting the antibiotic therapy and the CRP level decreased to 5 mg/L. She was discharged with oral ciprofloxacin 500 mg twice to complete the treatment course, prednisolone 10 mg daily and hydroxychloroquine 200 mg twice a day. In her follow-up visits she had great improvement due to treatment and physical therapy and fortunately she can walk by herself.

## Discussion

Infection plays an important role in mortality and morbidity of SLE patients and the major concerns in diagnosis and treatment of such, mainly when it occurs in the joints [3, 5]. Joint infection is one of the leading causes of acute joint pain and swelling in patients with SLE. Bacterial arthritis in SLE patients needs much more attention as it can cause a rapid joint destruction and permanent loss of function [3]. Osteomyelitis caused by a contiguous spread of infection is another leading cause of acute joint pain and swelling which may be accompanied by septic arthritis. However, isolated osteomyelitis without septic arthritis could be occurred and is not easy to diagnose. Also delay in diagnosis can cause late morbidity. We can use CRP as a marker to differentiate these two conditions; briefly CRP levels during infections are usually greater than exacerbation of SLE, and CRP levels higher than 50 mg/L strongly suggest the presence of an infection [3]. In this case report, we described an SLE case with persistent right knee effusion. Our patient had high erythrocyte sedimentation rate (ESR) and CRP levels despite appropriate therapy for the arthritis due to her illness and it was a key point for us to search for any other reasons such as infection.

The major risk factors for bone and joint infection are trauma, recent joint surgery or arthroscopy, presence of arthritis, and a prosthetic joint. Moreover, for SLE patients, activity of disease has been recognized as an independent risk factor in occurring infection [3]. SLE made this case susceptible to infection. Another point is that common infections in SLE are *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumoniae*, *Pneumococcus*, *Proteus* and *Pseudomonas* [6], but *Salmonella* is an unusual agent as we found in our patient. On the other hand, osteomyelitis due to *Salmonella* is not common. Possible reasons for susceptibility of SLE patients to *Salmonella* infection are abnormal functioning of mononuclear phagocytic system, decreased serum complement opsonizing activity, functional hyposplenism and hemolysis [2, 7-11].

Medina et al indicated that patients with lupus and renal involvement are more predisposed to *Salmonella* infection in comparison with patients without renal involvement [10]. Other factors that accompany with implanting and growth of bacteria are active SLE. All these issues were seen in our case [10]. Shahram et al evaluated 37 cases of SLE with *Salmonella* infection. In this study, 81% of patients were presented with constitutional symptoms (fever and chills), 27% with diar-

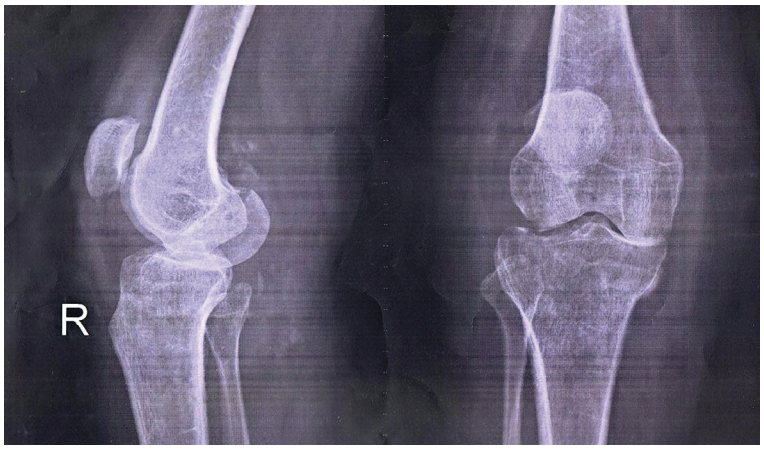


**Figure 1.** Knee radiography showing joint space narrowing and periosteal reaction.

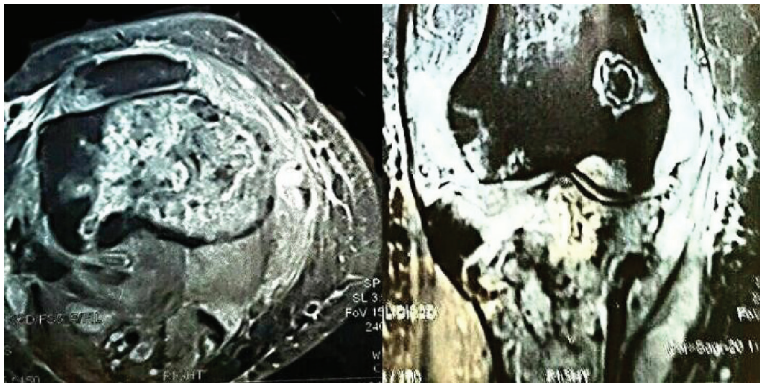

**Figure 2.** MRI of the knee showing geographic shape lesions in distal of femur, proximal of tibia and patella.

rhea and 11% with abdominal pain [2]. However, none of the above manifestations were observed in our case due to taking prednisolone and Cellcept that could obscure several signs and symptoms of infection such as fever and chills. There are a few reports of bone salmonellosis in patients with SLE [6]. Here we reported a rare case of SLE with *Salmonella* infection and bone involvement.

For osteomyelitis treatment we usually need surgical therapy of debridement of necrotic bone together with antibiotic therapy to eradicate infection. Antimicrobial selection should be done according to the culture. For *Salmonella* osteomyelitis, the most commonly used antibiotics are fluoroquinolones, third generation cephalosporins and chloramphenicol [12]. Principally ciprofloxacin is able to kill intracellular salmonellae and is the best choice for treating *Salmonella* osteomyelitis [12]. Our patient also had a good response to this treatment and she could walk by herself after 1 month of her treatment.

As we discussed, in SLE patients who suspected to disease exacerbation, we should consider infection especially with less common organisms in differential diagnosis. We have to look for it in different parts of body, even unusual sites such as bones. Importantly, if there are unusual findings such as high levels of CRP and poor response to therapy, infection should be ruled out for preventing life-threatening or morbid complications [6].

In summary, rare infection site such as bone with unusual causes should be considered when an SLE patient develops acute joint pain and swelling, particularly if it is associated with elevated CRP levels and other features of active disease [3].

## Conflict of Interest

The authors declare no conflict of interest.

## References

1. Hersh AO, Alarcon GS, Bonetto C, Pernus YB, Kucuku M, Santuccio C, Zivkovic S, et al. Systemic Lupus Erythematosus: Case definition and guidelines for data collection, analysis, and presentation of immunization safety data. Vaccine. 2016;34(51):6572-6581.
2. Shahram F, Akbarian M, Davatchi F. Salmonella infection in systemic lupus erythematosus. Lupus. 1993;2(1):55-59.
3. Huang JL, Hung JJ, Wu KC, Lee WI, Chan CK, Ou LS.

 

Septic arthritis in patients with systemic lupus erythematosus: salmonella and nonsalmonella infections compared. Semin Arthritis Rheum. 2006;36(1):61-67.
4. Benamour S, Fares L, el Kabli H, Belbachir M. [Systemic lupus erythematosus and Salmonella enteritidis osteomyelitis]. Rev Med Interne. 1995;16(9):684-686.
5. Galindo M, Mateo I, Pablos JL. Multiple avascular necrosis of bone and polyarticular septic arthritis in patients with systemic lupus erythematosus. Rheumatol Int. 2005;25(1):72-76.
6. Picillo U, Italian G, Marcialis MR, Ginolfi F, Abbate G, Tufano MA. Bilateral femoral osteomyelitis with knee arthritis due to Salmonella enteritidis in a patient with systemic lupus erythematosus. Clin Rheumatol. 2001;20(1):53-56.
7. Lovy MR, Ryan PF, Hughes GR. Concurrent systemic lupus erythematosus and salmonellosis. J Rheumatol. 1981;8(4):605-612.
8. Abramson S, Kramer SB, Radin A, Holzman R. Salmonella bacteremia in systemic lupus erythematosus. Eight-year experience at a municipal hospital. Arthritis Rheum. 1985;28(1):75-79.
9. Shiota K, Miki F, Kanayama Y, Kohno M, Ohe A, Takamatsu K, Inoue T. Suppurative coxitis due to Salmonella typhimurium in systemic lupus erythematosus. Ann Rheum Dis. 1981;40(3):312-314.
10. Medina F, Fraga A, Lavalle C. Salmonella septic arthritis in systemic lupus erythematosus. The importance of chronic carrier state. J Rheumatol. 1989;16(2):203-208.
11. Sanchez-Guerrero J, Alarcon-Segovia D. Salmonella pericarditis with tamponade in systemic lupus erythematosus. Br J Rheumatol. 1990;29(1):69-71.
12. McAnearney S, McCall D. Salmonella osteomyelitis. Ulster Med J. 2015;84(3):171-172.